

ABSTRACT

A mono crystalline diamond cutting tool is provided which can perform ultra precision machining on a crystalline material or a hard and brittle material with good swarf discharge and reduced cutting resistance to improve a precision of a cut surface, and has less wear or microchipping of a cutting edge and thus achieves long life.

A tip (2) having a cutting edge ridge in a rounded shape at a front end is provided, and a portion of the cutting edge ridge serving at least as a cutting edge (5) is formed to have constant roundness by intersecting a first conical surface as a rake face (3) with a second conical surface as a flank (4). The cutting edge ridge is rounded with a radius of less than 100 nm, the first conical surface has a width of 1 to 5 μm , and a swarf release face (6) substantially perpendicular to a cutting direction is provided in a portion on a side of the first conical surface opposite a line of the cutting edge ridge. An intersection of the first conical surface and the swarf release face has a rounded face with a radius of 0.1 to 1.0 μm . The first conical surface has a negative rake angle of 15° to 50° .